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(54) RETENTION MECHANISM FOR VEHICLE WHEEL ASSEMBLY

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(56) References Cited

U.S. PATENT DOCUMENTS

4,893,960 A 1/1990 Beier

5,353,890	Α		10/1994	Clohessy	
5,366,300	Α		11/1994	Deane	
5,443,316	A		8/1995	Deane	
5,740,895	Α	٠	4/1998	Bigley	192/69.41
5,984,422	Α		11/1999	Seifert	
6,082,514	Α	*	7/2000	Averill	192/69.42
6,089,673	Α		7/2000	Wiacek	
6,109,411	Α		8/2000	Bigley	
6,170,628	B1	*	1/2001	Bigley	192/69.41
6,234,289				Baker et al	

OTHER PUBLICATIONS

Internet Web Pages: http://www.joining tech.com/Friction.htm, http://www.tiac.net/users/nctinc/index.html, http://www.tiac.net/users/nctinc/net_narr.htm, http://www.tiac.net/users/nctinc/net_char.jpg.

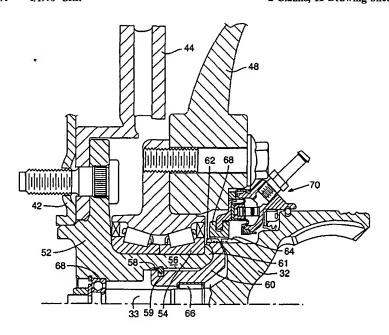
* cited by examiner

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(57) ABSTRACT

A wheel end assembly including a live spindle secured to a wheel hub at an outboard end. A bearing surrounding the spindle and abutted against a shoulder on the spindle. Said bearing preloaded by a retention structure that slidably engages the bearing to compress the bearing against the shoulder. A clutch ring slidably engages splines associated with the live spindle and with an axle portion to connect and disconnect the axle to the live spindle and accordingly the wheel hub.

2 Claims, 11 Drawing Sheets



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